FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

ACGIH TLV for radiofrequency/microwave radiation

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☐ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

12. Describe how the levels of risk and cost are consistent with management performance goals.

The requirements cited in #3 above are based on ANSI C95.1-1966. Dependencies on wavelength, orientation, modulation, presence of ground planes, and electrical shock potential were poorly understood and not accounted for. Fermilab has been following the standard in #8 and this has resulted in levels of ES&H and cost performance that are consistent with management goals including the use of industrial standards for industrial issues. They are sufficient to prevent electrical shocks and provide a safety factor of at least ten for reasonably well understood minor transient EM radiation (behaviorial) effects.

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

We believe we are currently in compliance with the standard cited in #8 above. Experience has demonstrated that this program is both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☐ Identification Team

1. Issue(s)

099. NIR - ultraviolet light
149. Thermal - ultraviolet radiation / sun exposure

Focus group

☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety
☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

29 CFR 1910.133(a)(5) (Eye and face protection)
29 CFR 1910 Subpart I Appendix B (PPE)
29 CFR 1910.252(b) (Welding, cutting, brazing)
29 CFR 1926.102(b)(1) (Eye and face protection)
29 CFR 1926.353(d) (Ventilation and protection in welding, cutting, brazing)

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☐ YES ☒ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

ACGIH TLV for ultraviolet radiation

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☐ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

12. Describe how the levels of risk and cost are consistent with management performance goals.

The requirements cited in #3 above provide adequate protection against ultraviolet radiation encountered in electric metal joining and cutting operations. Compliant welding safety practices have been in place at Fermilab and, except when not obeyed, have acceptably prevented the occurrence of harmful ultraviolet exposure effects. Since exposure to incoherent ultraviolet radiation also infrequently occurs in association with other types of operations (UV lamps for sterilization or electronic applications), the requirements are not sufficient to preclude possible adverse effects. These remaining activities are addressed by the standard cited in #8 above. Past adherance to the these standard has resulted in levels of ES&H and cost performance that are consistent with management goals including the use of industrial standards for industrial issues.

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

Given that even moderate exposures to sunlight exceed the standard cited in #8 above (~30 minutes at mid-day in summer) and the hazards are well-known and generally-accepted by most people, it is assumed that the exposure limits can be considered as guides, rather than absolute limits for typical sunlight exposures. In fact, the cited standard indicates that the values should be used as guides and not regarded as a fine line between safe and dangerous levels. With this single caveat, Fermilab is currently in compliance with the standards cited in #3 and #8. Experience has demonstrated that this program is both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☐ Identification Team

1. Issue(s)

101. ODH - cryogenic gas or liquid leaks
102. ODH - cryogenic spills
103. ODH - gaseous argon or other detector gas
104. ODH - leak of supplied gas
085. Magnetic fields - quench effects

Focus group
☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety
☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☐ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☐ YES ☒ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☐ YES ☒ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☐ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☒ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

Fermilab ES&H Manual chapter 5064, Oxygen Deficiency Hazard, has been in force for over 15 years. It was developed to specifically address the ODH hazards at Fermilab and to minimize the potential risks.

12. Describe how the levels of risk and cost are consistent with management performance goals.

Past adherance to the internal standard in #11 has resulted in levels of ES&H and cost performance that are consistent with management goals. There have been very few, if any, injuries or illnesses stemming from activities falling under the scope of Fermilab's ODH program since its initiation.

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

This program is fully implemented, works well, and is a cost effective program. It is assumed that ODH is the only significant ES&H issue associated with "magnetic fields - quench effects." Experience has demonstrated that this program is both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☐ Hazard analysis ☒ Identification Team

1. Issue(s)

105B. ODH - mechanical refrigeration systems

Focus group
☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety
☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☐ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☐ YES ☒ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

ASHRAE - 15 - 1989 or later version

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☒ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

Fermilab ES&H Manual Chapter 5035, Mechanical Refrigeration Systems, incorporates the above mentioned standard. This chapter effectively references the ASHRAE standard.

12. Describe how the levels of risk and cost are consistent with management performance goals.

Past adherance to the internal standard in #11 (based on the external standard in #8) has resulted in levels of ES&H and cost performance that are consistent with management goals including the use of industrial standards for industrial issues.

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

Adoption of the national standard in #11 (based on the external standard in #8) has made it easier to design and evaluate mechanical refrigeration rooms. Experience has demonstrated that this program is both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☐ Identification Team

1. Issue(s)

106. Other mechanical hazards - general environmental control

Focus group ☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety ☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

29 CFR 1910.94
29 CFR 1910.95
29 CFR 1910.96
29 CFR 1910.97
29 CFR 1926.50
29 CFR 1926.51
29 CFR 1910.52
29 CFR 1910.55
29 CFR 1926.56
29 CFR 1926.57
29 CFR 1926.59
29 CFR 1910 Subpart J

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☐ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☐ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☐ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

12. Describe how the levels of risk and cost are consistent with management performance goals.

Past adherance to the statutory requirements in #3 has resulted in levels of ES&H and cost performance that are consistent with management goals including the use of industrial standards for industrial issues.

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

Experience has demonstrated that this program is both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☐ Identification Team

1. Issue(s)

107. Other mechanical hazards - machine guarding

Focus group

☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety
☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

29 CFR 1910 Subpart O

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☐ YES ☒ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

ANSI B15.1 (Power transmission apparatus)
ANSI O1.1 (Woodworking machinery)
ANSI B11 series (Metalworking - applicable sections)

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☐ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

12. Describe how the levels of risk and cost are consistent with management performance goals.

Past adherance to the statutory requirement in #3 and the external standards in #8 has resulted in levels of ES&H and cost performance that are consistent with management goals including the use of industrial standards for industrial issues. The associated program includes annual inventories of machines and an on-going inspection program to verify compliance.

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

Adherence to machine guarding requirements has been well addressed at the Laboratory. Through an on-going process for verification all machines have been inspected, and inventoried. Machines built and purchased prior to the current legal requirements had guards designed and affixed. Experience has demonstrated that this program is both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☐ Identification Team

1. Issue(s)

108. Other mechanical hazards - machinery and rotating parts

Focus group ☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety ☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

29 CFR 1910 Subpart F
29 CFR 1910 Subpart N
29 CFR 1910 Subpart O
29 CFR 1910 Subpart P

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☐ YES ☒ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

ANSI B11 series (Metalworking - applicable portions)
ANSI B15.1 (Power transmission apparatus)
ANSI O1.1 (Woodworking machinery)

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☐ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

12. Describe how the levels of risk and cost are consistent with management performance goals.

Past adherance to the statutory requirements in #3 and the external standards in #8 has resulted in levels of ES&H and cost performance that are consistent with management goals including the use of industrial standards for industrial issues. The associated program includes an on-going inspection program to verify compliance.

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

Machinery and rotating parts have been well addressed on an continuous basis where deficiencies arise. Experience has demonstrated that this program is both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☐ Identification Team

1. Issue(s)

109A. Other mechanical hazards - medical and first aid
blood borne pathogens, lead, noise, asbestos, and respiratory protection

Focus group ☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety
☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

29 CFR 1910.151 (medical services and first aid)
29 CFR 1910.1030 (Blood borne pathogens)
29 CFR 1910. 1025(j) (Lead)
29 CFR 1910.95(g) and (h) (Noise)
29 CFR 1910.1001(Asbestos)
29 CFR 1910.134 (b)(10) (Respiratory protection)

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☐ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☐ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☐ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

12. Describe how the levels of risk and cost are consistent with management performance goals.

Past adherance to the statutory requirements in #3 has resulted in levels of ES&H and cost performance that are consistent with management goals including the use of industrial standards for industrial standards.

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

Implementation is on-going and effective. Personnel are Illinois licensed professionals with experience in occupational health. Experience has demonstrated that this program is both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☒ Identification Team

1. Issue(s)

109B. Surveillance - tuberculosis

Focus group ☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety ☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☐ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☐ YES ☒ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

Il. Department of Public Health, DuPage County Dept. Public Health. CDC December 7,1990

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☐ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

12. Describe how the levels of risk and cost are consistent with management performance goals.

Past adherance to the standard in #8 has resulted in levels of ES&H and cost performance that are consistent with management goals including the use of industrial standards for industrial standards. Medical surveillance (administering the T. B. Mantoux skin tests) is available to our teachers at the Childrens' Center. These individuals are at a slightly higher risk of TB exposure due to international nature of children with whom they work.

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

LSS/Medical Department Work Processes include medical surveillance for tuberculosis according to DuPage County Public Health Department. Experience has demonstrated that this program is both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☐ Identification Team

1. Issue(s)

110. Other mechanical hazards - powered platforms

Focus group

☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety
☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

29 CFR 1910 Subpart F (Powered Platforms, Manlifts, and Vehicle Mounted Work Platforms)

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☐ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☐ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☐ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

12. Describe how the levels of risk and cost are consistent with management performance goals.

Past adherance to the statutory requirement in #3 has resulted in levels of ES&H and cost performance that are consistent with management goals including the use of industrial standards for industrial hazards.

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

Experience has demonstrated that this program is both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☒ Identification Team

1. Issue(s)

111A. Other mechanical hazards - pressurized tanks and containers

Focus group ☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety ☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

29 CFR1910.169 (Air receivers)

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☐ YES ☒ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

ASME Pressure Vessel Code - Section VIII

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☐ YES ☒ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☒ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

Fermilab ES&H Manual Chapter 5031, Pressure Vessels, has been written and in use for over 15 years. It has effectively minimized personnel exposure and equipment downtime from vessel failures.

12. Describe how the levels of risk and cost are consistent with management performance goals.

Past adherance to the internal standard in #11 has resulted in levels of ES&H and cost performance that are consistent with management goals. There is a provision in 5031 that allows an exemption by the Director if certain portions of the Code requirements are not able to be met. This provision is important in our research environment and must be maintained in order for our mission to be met. The statutory requirement in #3 is limited to air compressors and is based on the 1968 edition of the standard in #8. Since Fermilab has a wider variety of vessels and gases to contend with, the standard in #8 is a much better and up to date "fit."

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

The internal standards identified in #11 (based on the external standard in #8) have proven to be both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☒ Identification Team

1. Issue(s)

111B. Other mechanical hazards - pressurized lines and piping systems

Focus group ☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety ☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

29 CFR1910.169 (Air receivers)

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☐ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☐ YES ☒ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

ASME/ANSI B31.1
ASME/ANSI B31.3
ASME/ANSI B31.5
ASME/ANSI B31.8

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☒ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

Fermilab ES&H Manual Chapter 5031.1, Pressure Piping Systems, has been written and in use for over 15 years. It has effectively minimized personnel exposure and equipment downtime from piping failures.

12. Describe how the levels of risk and cost are consistent with management performance goals.

Past adherance to the internal standard in #11 has resulted in levels of ES&H and cost performance that are consistent with management goals. There is a provision in 5031.1 that allows an exemption by the Director if certain portions of the Code requirements are not able to be met. This provision is important in our research environment and must be maintained in order for our mission to be met. The statutory requirement in #3 is limited to piping for fuel gases. Since Fermilab has a wider variety of piping applications, the standards in #8 are a much better and up to date "fit."

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

The internal standards identified in #11 (based on the external standards in #8) have proven to be both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☐ Identification Team

1. Issue(s)

112. Other mechanical hazards - material grinding, cutting, and drilling

Focus group

☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety
☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

29 CFR 1910.94
29 CFR 1910.212-213
29 CFR 1910.215
29 CFR 1910.243

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☐ YES ☒ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

ANSI O1.1 (Woodworking machinery)
ANSI B11.8 (Drilling, milling, and boring machines)
ANSI B11.9 (Grinding machines)

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☐ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

12. Describe how the levels of risk and cost are consistent with management performance goals.

Past adherance to the statutory requirements in #3 and the external standards in #8 has resulted in levels of ES&H and cost performance that are consistent with management goals including the use of industrial standards for industrial hazards. The associated program includes provision of training and personal protective equipment.

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

Grinding, cutting, and drilling is performed frequently, through supervision, through the use of personal protective equipment made available to all employees, and training by supervision safe work practicies have been addressed. Experience has demonstrated that this program is both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☐ Identification Team

1. Issue(s)

113. Other mechanical hazards (also fire) - means of egress

Focus group ☐ Emergency Management ☒ Fire Protection ☐ Occupational Safety ☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

41 IAC - Fire Protection
100 IAC - Fire Prevention and Safety
71 IAC - Illinois Accessibility Code Subparts C-F
29 CFR 1910 Subpart E - Means of Egress
29 CFR 1910 Subpart L - Fire Protection
29 CFR 1926 Subpart F - Fire Protection and Prevention
Uniform Federal Accessibility Standards, Chapter 4, Accessible Elements and Spaces: Scope and Technical Requirements

4. Are there any aspects of these necessary standard(s) which do not add value? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

Neither 29 CFR 1910 nor Title 41 of the IL Administrative Code incorporate the current versions of NFPA Standards 101 and 101A which regulate egress provisions. These inflexible, prescriptive versions do not allow alternative, equivalent or superior measures to achieve the ES&H goals in addressing thr deficiencies which are especially relevant to structures like accelerator tunnels where the prescription is not applicable.

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☐ YES ☒ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

BOCA National Building Code
BOCA Fire Prevention Code
NFPA 101 & 101A current editions: Code for Safety to Life from Fire in Buildings and Structures

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☐ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

12. Describe how the levels of risk and cost are consistent with management performance goals.

The level of risk is consistent with management performance goals because the standards selected are those applicable to all public and commercial structures.

13. Pick the basic implementing assumption from the list.

☒ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☐ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

Compliance with the statutory prescription of providing a full exit every n-hundred feet throughout the beam line and accelerator enclosures would incur a very large cost for no discernible ES&H benefit. Since the enclosures are not designed for human occupancy and do not contain significant fire hazards, the full intent of the standards can be met using measures which provide levels of safety equivalent or superior to those prescribed by the dated requirement citations.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☐ Identification Team

1. Issue(s)

114. Other mechanical hazards - moving vehicles, carts, and forklifts

Focus group ☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety ☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

29 CFR 1910 Subpart N
29 CFR 1910 Subpart F

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☐ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☐ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☐ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

12. Describe how the levels of risk and cost are consistent with management performance goals.

Past adherance to the statutory requirements in #3 has resulted in levels of ES&H and cost performance that are consistent with management goals including the use of industrial standards for industrial hazards.

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

Experience has demonstrated that this program is both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☐ Identification Team

1. Issue(s)

115. Other mechanical hazards - special hand tools and power driven nail guns, etc.

Focus group ☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety
☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

29 CFR 1910.243
29 CFR 1926.302

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☐ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☐ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☐ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

12. Describe how the levels of risk and cost are consistent with management performance goals.

Past adherance to the statutory requirements in #3 has resulted in levels of ES&H and cost performance that are consistent with management goals including the use of industrial standards for industrial hazards. The associated program includes provision of training, and eye, head, and face protction.

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

The use of power driven nail guns does not occur on a frequent basis. This type of equipment is usually kept in secure locations under the control of supervisors and or competent subcontractors. Implementation of safe work practices is enforced through internal oversight for Laboratory employees, and contractual agreements with subcontractors. Experience has demonstrated that this program is both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☐ Identification Team

1. Issue(s)

116. Other mechanical hazards - work with roads and grounds equipment

Focus group
☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety
☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

29 CFR 1910.132-133
29 CFR 1910.136
29 CFR 1910.212
29 CFR 1910.215
29 CFR 1910.241
29 CFR 1910.243-244
29 CFR 1928 Subpart C (Roll-over protective structures)
29 CFR 1928 Subpart D (Safety for agricultural equipment)

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☐ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☐ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☐ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

12. Describe how the levels of risk and cost are consistent with management performance goals.

Past adherance to the statutory requirements in #3 has resulted in levels of ES&H and cost performance that are consistent with management goals including the use of industrial standards for industrial hazards. These requirements provide an equivalent level of safety as analogous requirements in 29 CFR 1928.

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

It is assumed that compliance with the requirements given in #3 above are equivalent to those given in 29CFR1928. Experience has demonstrated that this program is both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☐ Identification Team

1. Issue(s)

117. Other personal hazards - confined space

Focus group ☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety
☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

29 CFR 1910.146-147

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☐ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☐ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☐ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

12. Describe how the levels of risk and cost are consistent with management performance goals.

Past adherance to the statutory requirements in #3 has resulted in levels of ES&H and cost performance that are consistent with management goals including the use of industrial standards for industrial hazards.

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

Experience has demonstrated that this program is both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☐ Identification Team

1. Issue(s)

119. Other personal hazards - hazards requiring PPE
126. Other personal hazards - sharp edges

Focus group ☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety ☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

29 CFR 1910 Subpart I
29 CFR 1926 Subpart E
Other PPE requirements picked up in specfic OSHA standards

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☐ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☐ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☐ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

12. Describe how the levels of risk and cost are consistent with management performance goals.

Past adherance to the statutory requirements in #3 has resulted in levels of ES&H and cost performance that are consistent with management goals including the use of industrial standards for industrial hazards.

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

Experience has demonstrated that this program is both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☐ Identification Team

1. Issue(s)

120. Other personal hazards - high noise levels

Focus group

☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety
☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

29 CFR 1910.95

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☐ YES ☐ NO

If yes, continue; otherwise skip to 10.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

8. External sufficient standard citation

9. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with the above (non-statutory) external standard? ☐ YES ☐ NO

If no continue; otherwise skip to 12.

10. Is an internal standard required to attain a level of risk consistent with management performance goals? ☐ YES ☐ NO

11. Describe nature and status of internal sufficient standard.

12. Describe how the levels of risk and cost are consistent with management performance goals.

Past adherance to the statutory requirement in #3 has resulted in levels of ES&H and cost performance that are consistent with management goals including the use of industrial standards for industrial hazards.

13. Pick the basic implementing assumption from the list.

☐ Major positive impact ☐ Minor negative impact
☐ Minor positive impact ☐ Major negative impact
☒ No net impact

14. Describe the nature and status of implementation including cost-effectiveness.

Experience has demonstrated that this program is both successful and cost-effective.

FERMILAB IDENTIFICATION TEAM DOCUMENTATION

Issue origin ☒ Hazard analysis ☐ Identification Team

1. Issue(s)

121. Other personnel hazards - housekeeping

Focus group ☐ Emergency Management ☐ Fire Protection ☒ Occupational Safety ☐ Environmental Protection ☐ Management & Oversight ☐ Radiation Protection

2. Is there a necessary standard which applies to this issue? ☒ YES ☐ NO

If yes, continue; otherwise skip to 6.

3. Necessary standard(s)

29 CFR 1926.25
29 CFR 1910.22
29 CFR 1910.106
29 CFR 1910.176
29 CFR 1910.141

4. Are there any aspects of these necessary standard(s) which do not add value? ☐ YES ☒ NO

If yes, continue; otherwise skip to 6.

5. Description of non-value added aspects of necessary standard(s).

6. Is the level of risk associated with the issue(s) consistent with management performance goals assuming compliance with applicable necessary standards? ☒ YES ☐ NO

If no continue; otherwise skip to 12.

7. Is there a non-required external standard which applies to this issue? ☐ YES ☐ NO

If yes, continue; otherwise skip to 10.